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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/773,610	02/06/2004	Akira Yamanaka	17475US02	7768
23446 7590 04/08/2009 MCANDREWS HELD & MALLOY, LTD 500 WEST MADISON STREET SUITE 3400 CHICAGO, IL 60661				
EXAMINER BAYARD, EMMANUEL				
ART UNIT 2611		PAPER NUMBER		
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/773,610

**Applicant(s)**

YAMANAKA ET AL.

**Examiner**

Emmanuel Bayard

**Art Unit**

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 January 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SE/US)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

This is in response to amendment filed on 1/09/09 in which claims 1-17 are pending.

The applicant's arguments have been fully considered but they are moot based on the new ground of rejection.

#### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, 5-8, 10-13 and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al U.S. Pub No 20040131109 A1 in view of Russel et al U.S. Patent No 6,088,390.

1. As per claim 1, Kim et al teaches a method for equalization in a communications system, the method comprising: Decision feedback equalizer that is used for removing post cursor inter-symbol interference (See fig.1b element 16 and abstract and paragraph [0016-0017]) in a block code based error correction scheme (see fig.1b element 92 and paragraphs [0024] and [0046-53] and page 7, lines 27-30); wherein said block code based error correction scheme is utilized in the communication system (see paragraph [0010-0013]).

2. However Kim does not teach removing post cursor inter-symbol interference **within at least one error correction code word** in a block code.

3. Russel et al teaches a DFE for removing post cursor inter-symbol interference **within at least one error correction code word** in a block code (see fig.5 element 504 and 506 and abstract and col.1, lines 45-67 and col.2, lines 18-40 and col.5, lines 1-35).
4. It would have been obvious to one of ordinary skill in the art to implement the teaching of Russel into Kim as to accurately obtain the desired bit error rate as taught by Russell (see col.4, line 67-col.5, line 1).
5. As per claim 2, Kim et al and Russell in combination would teach, wherein said removing of post cursor inter-symbol interference comprises removing symbol interferences from at least one previous error correction code word utilizing a decision feedback equalization filter (See Kim fig.1b element 16 and abstract and paragraph [0016-0017]) as to accurately obtain the desired bit error rate as taught by Russell (see col.4, line 67-col.5, line 1).

As per claim 3, Kim et al teaches, wherein said removing of post cursor inter-symbol interference comprises utilizing distortion filtering in said decision feedback equalization filter, for generating filtered symbols (see paragraphs [0008], [0050]).

As per claim 5, As per claim 2, Kim et al and Russell in combination would teach, wherein said removing of post cursor inter-symbol interference comprises adding scalar terms (see Kim fig.1b element 15 or output of element 16) for each of said at least one error correction code word to a decision metric (see Kim paragraphs [0035], [0052]) of a real part of a projection of said filtered symbols to said at least one error

correction code word as to accurately obtain the desired bit error rate as taught by Russell (see col.4, line 67-col.5, line 1).

6. As per claim 6, Kim et al teaches A system for equalization in a communications system see paragraph [0010-0013]), the system comprising: a modulation system (see paragraphs [0015] [0030]) utilizing a block code based error correction scheme (see fig.2 element 200 and col.3, lines 16-20); and a feedback equalization filter (See fig.1b element 16 and abstract and paragraph [0016-0017] provided within said modulation system for removing post cursor inter-symbol interference to(see fig.1.b element 92 and paragraphs [0024] and [0046-53] and page 7, lines 27-30) make at least one decision in said block code based error correction scheme.

7. However Kim does not teach removing post cursor inter-symbol interference **within at least one error correction code word** in a block code.

8. Russel et al teaches a DFE for removing post cursor inter-symbol interference **within at least one error correction code word** in a block code (see fig.5 element 504 and 506 and abstract and col.1, lines 45-67 and col.2, lines 18-40 and col.5, lines 1-35).

9. It would have been obvious to one of ordinary skill in the art to implement the teaching of Russel into Kim as to accurately obtain the desired bit error rate as taught by Russell (see col.4, line 67-col.5, line 1).

10.

11. As per claims 7, 12 Kim et al and Russell in combination would teach, wherein said feedback equalization filter removes symbol interferences from at least one previous error correction code word (See Kim fig.1b element 16 and abstract and paragraph [0016-0017]) as to accurately obtain the desired bit error rate as taught by Russell (see col.4, line 67-col.5, line 1).

As per claims 8, 13 Kim et al teaches, wherein said feedback equalization filter comprises a distortion filter that generates filtered symbols (see paragraphs [0008], [0050]).

12. As per claims 10, 15 Kim et al and Russell in combination would teach comprising a decision metric (see paragraphs [0035], [0052]) for said feedback equalization filter, wherein scalar terms are added (see fig.1b element 15 or output of element 16 for each of said at least one error correction code word to a decision metric of a real part of a projection of said filtered symbols to said at least one error correction code word as to accurately obtain the desired bit error rate as taught by Russell (see col.4, line 67-col.5, line 1).

As per claim 11, Kim et al teaches a method for equalization in a communications system, the method comprising: performing block code based error correction during signal modulation in the communications system; and making at least one decision with minimum error power-based criteria during said block code based error correction with a decision feedback equalization filter that removes post cursor inter-symbol interference. (See rejection of claim 1 above. Also note that DFE (decision

feedback equalizer is well known in the art to MMSE (Minimum mean square error) or LMSE (Least mean square error) to generate minimum error power.

13. However Kim does not teach removing post cursor inter-symbol interference **within at least one error correction code word** in a block code.
14. Russel et al teaches a DFE for removing post cursor inter-symbol interference **within at least one error correction code word** in a block code (see fig.5 element 504 and 506 and abstract and col.1, lines 45-67 and col.2, lines 18-40 and col.5, lines 1-35).
15. It would have been obvious to one of ordinary skill in the art to implement the teaching of Russel into Kim as to accurately obtain the desired bit error rate as taught by Russell (see col.4, line 67-col.5, line 1).

As per claim 16, Kim et al teaches, wherein said block code based error correction scheme is utilized in a modulation system of the communication system (see paragraph [0010-0013], [0015] [0030]).

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 4, 9 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al U.S. Pub No 20040131109 A1 in view of Russel et al U.S. Patent No 6,088,390 in further view of Yen U.S. Pub No 2003/0123,586 A1.

As per claims 4, 9 and 14, Kim et al and Russel in combination teach all the features of the claimed invention except wherein utilizing distortion filtering further comprises inserting a matrix multiplication-based filter after a feed forward equalizer filter and a feedback filter in the modulation system for symbol interference from the symbols in previous error correction code words.

Yen teaches inserting a matrix multiplication device is the same as the claimed ( a matrix multiplication-based filter) after a feed forward equalizer filter and a feedback filter in the modulation system for symbol interference from the symbols in previous error correction code words (see fig.5 element 542 and page 1 [0011] and page 3 [0032-00035]).

It would have been obvious to one of ordinary skill in the art to implement the teaching of Yen into Kim et al and Russel combination as to make the maximum possible detection and increase the capability of receiving as taught by Yen (see page 4 [0037]).

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.



4. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al U.S. Pub No 20040131109 A1 in view of Russel et al U.S. Patent No 6,088,390 in further view of Wei et al U.S. Pub no 2004/0125884 A1.

As per claim 17, Kim et al and Russel in combination teach all the features of the claimed invention except selecting a code word for said block code based error correction scheme, based on said removing of post cursor inter-symbol interference within said at least one error correction code word.

Wei et al teaches selecting a code word for said block code based error correction scheme, based on said removing of post cursor inter-symbol interference within said at least one error correction code word (see page 1 [0004-0005], [0011]).

It would have been obvious to one of ordinary skill in the art to implement the teaching of Wei into Kim et al and Russel as to provide tentative decisions designated to find symbol from the signal constellation closest to the ideally ISI free receive signal sample as taught by Wei (see page 2 [0014]).

#### ***Conclusion***

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

6. Schmidt et al U.S. Patent No 7,130,343.

7. Hu et al U.S. Patent No 7,187,730.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel Bayard whose telephone number is 571 272

3016. The examiner can normally be reached on Monday-Friday (7:Am-4:30PM)  
Alternate Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571 272 3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

4/7/2009

Emmanuel Bayard  
Primary Examiner  
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